# MEMORANDUM

**Date:** **December 5, 2000**

**Subject:** **Wet-Weather Model (WWM) Vendor Meeting Minutes**

**Location:** **USEPA/NRMRL, Edison, NJ**

**Attendees:** **ETV Staff/Contractors:**

**Penelope Hansen, ETV Program Coordinator, USEPA**
**Mary Stinson, NRMRL/ USEPA**
**Dennis Lai, NRMRL/ USEPA**
**Richard Field, NRMRL/USEPA**
**Ray Frederick, NRMRL/USEPA**
**Sri Rangarajan, Limno-Tech, Inc.**
**Charles Rowney, CDM**
**Bill McMillin, HydroQual**
**John Schenk, NSF International**
**Donna Hackett, NSF international**

**Vendors:**

**Nate Baldwin, CSR Stormceptor (for Graham Bryant)**
**Sten Lindberg, DHI**
**Bill Walker, DHI**
**Richard Head, WRc**
**Jack Cook, Haestad Methods**
**Michael Glazner, Haestad Methods**
**Brad Pierce, AGT**

Dr. John Schenk, NSF pilot manager for the Environmental Technology Verification (ETV) Wet Weather Flow (WWF) Pilot, welcomed all participants to the Wet-Weather Model Vendor Meeting, and requested self-introductions. Dr. Schenk then read the NSF Anti-trust Statement, and then reviewed the goals for the meeting, emphasizing the importance of vendor input:

- Familiarize vendors with the USEPA's ETV Program and the Wet-Weather Flow Technologies Pilot
- Discuss Vendor's role in WWF Pilot
- Describe the ETV Approach to Testing
- Obtain Vendor Input

## ETV Overview

Mary Stinson, EPA (NRMRL/US EPA) pilot manager for the ETV WWF Pilot, provided a comprehensive overview of the ETV Program. Mary emphasized the ETV goal of providing third party credible data to buyers and permitters of commercially available technologies. Availability of this data provides several major benefits:

- brings recognition and accelerates marketplace acceptance
- facilitates permitting
- allows buyers to make informed buying decision
- reduces risk for financial investors
- levels playing field among competitors
- facilitates the export of technologies

## WWF/Runoff Models Overview

Donna Hackett, NSF project coordinator for the ETV WWF Pilot, presented an overview of the WWF Pilot, one of the twelve pilots in the ETV program. The WWF Pilot came into being as a cooperative agreement between NSF International and the USEPA in July of 1998. The WWF Pilot's primary objective is the verification of technologies used in the assessment, characterization, control, and/or abatement of pollution related to urban stormwater runoff, combined sewer overflows, and sanitary sewer overflows. Other objectives of the Pilot include: 1) addressing the needs identified by the vendors and stakeholders, and 2) fulfilling the objectives of the overall ETV program.

Additional members of the WWF Pilot in addition to NSF and EPA include: 1) A Stakeholder Advisory Group (SAG) representing a range of stakeholders 2) Five technology panels representing the respective technology priorities of the pilot and 3) Subcontractors for protocol and test plan development as well as field-testing.

The roles and responsibilities of vendors participating in verification were then addressed. These include providing input to both the protocol and test plan, providing detailed information about the technology being verified, and reviewing the Verification Report .

Donna Hackett then presented the specifics of the Wet Weather Model (WWM) technology category of the WWF Pilot. The technology panel members were listed including the Chair, Dr. Charles Rowney from CDM and representatives from industry, government, and universities. An update of the WWM status was presented, primarily the completion of final drafts of the verification protocol and accompanying mock test plan and mock verification report. The next imminent step for the WWM technology category would be vendor sign up, test plan development for each submitted model, followed by actual testing, and then drafting of the Verification Report for each model tested. Based on vendor survey information and Technology Panel input, the scope of model verification will be initially limited to urban landside quantity models. Hydrodynamic models may be addressed at a later date. Making and keeping verification affordable for Wet Weather Model Verification was then addressed. Strategies to

achieve this include the development of a reasonable protocol and the selection of a capable testing organization.

The "Keys to Success" were then presented, including:

- strong recognition of ETV by all stakeholders
- maintenance of a level playing field
- answering the right, key questions of prospective buyers/users
- production of quality verification reports and statements

At the conclusion of Donna's presentation, Rich Field from NRMRL/US EPA asked if the vendors had to approve the verification results as part of their roles/responsibilities. John Schenk clarified that vendors will be given a chance to review the Report for accuracy in representation of model capabilities and test but they have no authority to approve. Ray Frederick from NRMRL/US EPA pointed out that the vendors can comment on the results, including in the Verification Report a narrative of circumstances that occurred during testing which affected the test results. John Schenk also stated that the vendors should have confidence in the model that they are submitting for verification, since the results will be published on the Web for public reference.

John Schenk then listed the other four technology areas of the WWF pilot presently considered priorities for verification:

- Stormwater Treatment Technologies
- Area/Velocity Flowmeters
- High-Rate (Vortex and Chemically Enhanced High-Rate Separation)
- High-Rate Disinfection Technologies (Induction Mixers for chemical disinfectants and UV Disinfection)

Mixers (Mastrrr Corp. and U.S. Filter) and Stormwater Treatment Devices (over a dozen vendors) are both in the testing phase of verification.

**Overview of Verification Protocol, Mock Verification Report, and /Mock Test Plan for Runoff Models**

Sri Rangarajan from Limno-Tech, Inc., the sub-contractor for protocol development, presented an overview of the latest draft of the WWM Verification Protocol, and the mock verification report/test plan developed to "test drive" the protocol.

Highlights from Sri's presentation include:

- Distinction between documentable and verifiable elements of the model.
- Generic three-step procedure, recommended by the technology panel, for testing each model element
- List of general elements and hydrology-related elements that are recommended by the panel, and described in the protocol
- Example descriptions of two tests, precipitation records and infiltration, along with test procedures and presentation of results.

- Scope of the mock test plan and verification report.
- Examples of two tests in detail, as presented in the mock test plan and verification report, for reading in precipitation values and checking the open and closed-conduit conveyance, along with assumptions and comparison of model results with off-line calculations.

Rich Field commented on one of the performance measures for urban runoff models: Does algorithm operate "as advertised?" Rich questioned that all the algorithms built in the model, whether or not advertised, should be tested. Sri responded that, if the model vendor advertised that certain algorithms have been built in the model (for example, Horton's equation for infiltration), then the model will be tested specifically for those algorithms. Sri added that, if the model is not designed to characterize certain elements suggested in the protocol, then they would not be tested. Charles Rowney stated that, in the Technology Panel's view, all the model elements that are built in a model and that the vendor would like to get tested, will be tested within the scope of this protocol.

**WWM ETV Cost Overview**

John Schenk from NSF International presented the total (ETV cost and the vendor's cost) cost information for WWM Verification. The cost of development of a generic test plan that can be applied, in its entirety or in portions to all the models, is about $20,000. In addition, the verification cost that includes testing and preparation of a verification report and statement is estimated to be $10,000 to 20,000 per model depending on the number of vendors who sign up. The vendor contribution requested is probably $10-15,000 per vendor per application. It is a requirement of the ETV Program that vendors contribute financially to the cost of verification in the form of a vendors' fee.

**Vendor Questions/Answers**

Sten Lindberg from DHI's Denmark office raised the question "What happens if a model is verified then modified, does the whole model need to be re-verified?" John Schenk replied that we were discussing that issue earlier that morning, and it needs to be addressed by the technology panel members. Charles Rowney from CDM interjected that more than likely just the modified portion of the model would be verified, and an addendum would be added to the original verification.

Jack Cook from Haestad Methods asked if a bank could conceivably require verification as a caveat for granting funding to a municipality for an urban runoff-modeling project? John Schenk stated that this could be the case, and to not be verified would be obviously detrimental in such an instance.

Charles Rowney from CDM pointed out the distinction between hydrologic and hydrodynamic classes of models. The hydrodynamic class covers a much fuller treatment of hydraulics, not just surface water runoff effects, but the dynamics within the sewer system. The hydrodynamic classification of models will be addressed further down the road, but first hydrologic wet weather models will be addressed.

Brad Pierce from AGT asked if there were any standards for the speed of software to give users an idea of how long a typical system will take. Sri. responded that Brad could refer to the mock test plan, and that there was a general platform that would give users an idea of how long a typical system will take. The speed of a certain model will be documented in its verification report (for example, the speed of SWMM4.4gu was discussed in the mock test plan).

Nate Baldwin from CSR asked who would be doing the testing. John Schenk replied that Limno-Tech, Inc. or an independent third party recommended by the vendor and approved by NSF could be used for testing. NSF International would not have the time or resources to do the testing.

Jack Cook from Haestad Methods asked to whom he should send his comments. John Schenk responded they should be sent to Donna Hackett at NSF International.

Bill Walker from DHI Inc. pointed out that several firms use variations of the same model (SWMM), which is part of the public domain. If one of these models is verified, does this imply verification of the other technology using the same public domain model? Charles Rowney responded that a modified version of a SWMM model is different than the original version, the wrapper is different. The modifications are embedded as part of the proprietary model. He also pointed out that SWMM "morphs" by itself, so you have to know the source and follow through.

John Schenk indicated that when we have the scope of the models (how many verifiable elements), if three have the same public-domain SWMM as their engine, for example, all vendors will be charged the same price so that there is no cost disadvantage for the first model being tested with SWMM engine. As a general guideline, the WWF Pilot will pay half the cost of testing. If there are two models with the same verifiable elements and the first model undergoing verification takes more time to verify, the vendor of this model will not be penalized financially. Both model vendors will be assessed the same amount for verification.

Rich Field asked John Schenk if all applications were going to be accepted, since EvTEC (another ETV Pilot Program) did not accept all applications, only those that passed the selection process. John responded that yes, we would take all applications submitted unless Limno-Tech, Inc. informs us the model doesn't fit into the urban runoff/hydrologic category we've selected initially for verification. Anyone has a right to seek verification.

Brad Pierce from AGT asked what the time line was for the hydrodynamic category. John Schenk said that it depends on funding available. John asked Sri how long it would take for development of the hydrodynamic protocol. Sri indicated that it would take approximately four months, to allow time for coordination with the technology panel and review of the protocol.

Bill Walker from DHI, Inc. asked if we were considering collecting field data to input into the model. John replied that about a year ago we were looking into this, but no

funding is presently available in the WWF Pilot. However, the Pilot program is planned to change into a long-term Center for verification of wastewater treatment technologies, including WWF technologies. If this Center is established, similar to the one presently set up for packaged drinking water, then this may be a possibility.

Sri Rangarajan added that it is hard to find a site where we can obtain data for testing all the model elements suggested in the protocol. The Rouge River Basin had been looked at, but the data developed was pertinent to SWMM model and the characterization of land use data was not comprehensive enough to develop parameters for other models. Development of any field data for model verification will be cost prohibitive and will require a longer schedule as well.

John Schenk also stated that we did not have the time luxury of taking two years to get the field data needed; the WWF pilot needed to get moving right away. It was one of the last pilots to get started in the ETV program, having been initiated just two years ago.

Jack Cook from Haestad Methods commented that the meeting clarified for him a majority of the comments/questions he had going into the meeting, and he will be sending the remaining comments shortly.

John Schenk and Mary Stinson concluded the meeting by introducing Penny Hansen, the ETV Program Coordinator from the USEPA, to the vendors attending the meeting. John indicated that WWF Pilot would be responsive to comments received from vendors related to our present approach to verification. Donna Hackett will be distributing the minutes from this meeting in the next couple weeks.